and/or free fatty acid uptake). Prior to the present invention, it was not known that the peripheral melanocortin receptors (and not central melanocortin receptors) and the compounds that bind to such receptors regulate metabolic efficiency. Moreover, the present inventors are the first to disclose an assay for the identification of compounds that preferentially bind to, activate, or inhibit the activity of MC2-R and/or MC5-R as compared to MC4-R, or which bind to, activate, or inhibit the activity of MC2-R and/or MC5-R in the absence of significant MC4-R binding or activation.

IN THE CLAIMS

Please cancel claims 6-9, 17-18, and 21.

Please amend claims 19, 22, and 26-28 as follows:

19.   A method for identifying compounds that regulate peripheral pathways of energy homeostasis, comprising:

a.   contacting a putative regulatory compound with an isolated adipocyte; and,

b.   detecting putative regulatory compounds that bind to a melanocortin receptor on said adipocyte, wherein said melanocortin receptor is a MC1-R, MC3-R, or MC5-R receptor, and wherein putative regulatory compounds that bind to said melanocortin receptor on said adipocytes are identified as compounds that regulate body weight by regulating peripheral pathways of energy homeostasis.

22.   A method for identifying compounds that preferentially bind to and activate peripheral melanocortin receptors comprising:

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a.   contacting a putative regulatory compound with a cell which

expresses a peripheral melanocortin receptor selected from a group consisting of MC1-R,

MC2-R, MC3-R and MC5-R;

b.   detecting whether the putative regulatory compound increases

activity of said melanocortin receptor;

c.   contacting said putative regulatory compound with a cell which

expresses a melanocortin 4-receptor (MC4-R); and

d.   detecting whether the putative regulatory compound increases

MC4-R activity;

wherein putative regulatory compounds that induce greater activity by said

peripheral melanocortin receptor as compared to said MC4-R are identified as

compounds that preferentially bind to and activate peripheral melanocortin receptors.

26.   A method for identifying compounds that preferentially bind to and

activate peripheral melanocortin receptors, comprising:

a.   contacting a putative regulatory compound with a cell or cell lysate

containing a reporter gene operatively associated with a regulatory element of a

peripheral melanocortin receptor selected from a group consisting of MC1-R, MC2-R,

MC3-R and MC5-R;

b.   detecting expression of the reporter gene product;

c.   contacting a putative regulatory compound with a cell or cell lysate

containing a reporter gene operatively associated with a regulatory element of a

melanocortin 4-receptor (MC4-R); and,

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d.   detecting expression of the reporter gene product;

wherein putative regulatory compounds that increase expression of the reporter gene product of (b) as compared to the reporter gene product of (d) are identified as compounds that preferentially bind to and activate peripheral melanocortin receptors.

27.   A method for identifying compounds for increasing body weight by inhibition of peripheral melanocortin receptors, comprising:

a.   contacting a putative regulatory compound with a cell or cell lysate containing transcripts of a peripheral melanocortin receptor selected from a group consisting of MC1-R, MC2-R, MC3-R and MC5-R; and,

b.   detecting translational inhibition of the melanocortin receptor transcript;

wherein putative regulatory compounds that inhibit said melanocortin receptor transcript are identified as compounds that inhibit peripheral melanocortin receptor expression.

28.   A method for identifying compounds that regulate peripheral melanocortin receptors selected from a group consisting of MC1-R, MC2-R, MC3-R and MC5-R, comprising:

a.   contacting a putative regulatory compound with an isolated adipocyte; and,

b.   detecting putative regulatory compounds that bind to a melanocortin receptor on said adipocyte, wherein putative regulatory compounds that

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bind to melanocortin receptors on said adipocytes are identified as compounds that

regulate peripheral melanocortin receptors.

Please add the following new claims 30-38:

30.   A method for identifying compounds that preferentially bind to and

activate peripheral melanocortin receptors other than MC2-R comprising:

a.   contacting a putative regulatory compound with a cell which

expresses a peripheral melanocortin receptor selected from a group consisting of MC1-R,

MC3-R and MC5-R ;

b.   detecting whether the putative regulatory compound increases

activity of said melanocortin receptor;

c.   contacting said putative regulatory compound with a cell which

expresses a melanocortin 2-receptor (MC2-R); and,

d.   detecting whether the putative regulatory compound increases

activity of said MC2-R melanocortin receptor;

wherein putative regulatory compounds that induce greater activity by said

peripheral melanocortin receptor as compared to said MC2-R are identified as

compounds that preferentially activate peripheral melanocortin receptors other than

MC2-R.

31.   The method of Claim 30, wherein said peripheral melanocortin receptor is

MC3-R.

32.   The method of Claim 30, wherein said step (b) of detecting is selected from the group consisting of measurement of melanocortin receptor transcription, measurement of melanocortin receptor translation, measurement of phosphorylation of melanocortin receptor, measurement of melanocortin receptor ligand binding activity, measurement of G protein activation, and measurement of melanocortin receptor translocation within a cell.

33.   The method of Claim 30, wherein said cell of step (a) is an adipocyte, and wherein step (b) of detecting is selecting from the group consisting of measurement of melanocortin receptor transcription, measurement of melanocortin receptor translation, measurement of G protein activation, measurement of melanocortin receptor ligand binding activity, measurement of melanocortin receptor translocation within a cell, measurement of lipolysis by said cell and measurement of free fatty acid uptake by said cell.

34.   The method of Claim 30, wherein said step (d) of detecting is selected from the group consisting of measurement of MC2-R transcription, measurement of MC2-R translation, measurement of phosphorylation of MC2-R, measurement of MC2-R ligand binding activity, and measurement of MC2-R translocation within a cell.

35.   A method for identifying compounds that increase body weight by regulating peripheral pathways of energy homeostasis, comprising:

a. contacting a cell which expresses a melanocortin receptor selected from the group consisting of MC1-R, MC3-R and MC5-R with proopiomelanocortin (POMC) compound which binds to and activates said melanocortin receptor in the presence and absence of a putative regulatory compound;

b. detecting whether said putative regulatory compound inhibits said melanocortin receptor activity;

wherein putative regulatory compounds that inhibit said melanocortin receptor activity are identified as compounds that increase body weight by regulating peripheral pathways of energy homeostasis.

36. The method of Claim 35, wherein said melanocortin receptor is MC3-R.

37. The methods of Claim 35, wherein said POMC compound is a melanocortin compound.

38. The method of Claim 35, wherein said POMC compound is selected from the group of α-MSH, β-MSH and γ-MSH.